

CLAIMS

1. An apparatus for manufacturing a metal nanotube comprising a cathode and an anode opposingly disposed, a film having
5 a penetrated hole provided on said cathode and an electrolyte solution filled between said cathode and said anode, wherein metal is precipitated on the wall surface of said penetrated hole,
wherein said cathode is a thin metal film having a thickness of 10 to 80 nm.
10
2. The apparatus for manufacturing a metal nanotube of Claim 1, wherein said cathode comprises gold, copper, a gold based alloy, a copper based alloy or a platinum-palladium alloy.
- 15 3. The apparatus for manufacturing a metal nanotube of Claim 1 or 2, wherein said cathode is a thin metal film obtained by an electrochemical processing of nanostructured tailored materials.
4. The apparatus for manufacturing a metal nanotube of
20 Claim 1, 2 or 3, wherein said anode comprises nickel, cobalt, iron or an alloy thereof.
5. The apparatus for manufacturing a metal nanotube of Claim 1, 2, 3 or 4, wherein the diameter of said penetrated hole is 15
25 to 500 nm.
6. The apparatus for manufacturing a metal nanotube of

Claim 1, 2, 3, 4 or 5, wherein said cathode and said anode are in a flat plate shape, and said cathode is disposed horizontally at an upper position and said anode is disposed horizontally at a lower position with respect to gravity.

5

7. A process for manufacturing a metal nanotube comprising:

a step of providing a thin metal film having a thickness of 10 to 80 nm on one surface of a film having a penetrated hole;

10 a step of filling an electrolyte solution containing metal ions between the cathode having said thin metal film and an anode and applying a voltage to electrolyze said electrolyte solution, thereby electrochemically precipitating metal on the wall surface of said penetrated hole; and

15 a step of immersing the film on which said metal is precipitated in a solvent to remove said film having a penetrated hole, thereby obtaining a metal nanotube.

8. The process for manufacturing a metal nanotube of
20 Claim 7, wherein said thin metal film comprises gold, copper, a gold based alloy, a copper based alloy or a platinum-palladium alloy.

9. The process for manufacturing a metal nanotube of
Claim 7 or 8, wherein the shape of said metal nanotube is controlled
25 by adjusting at least one condition selected from the pH of said electrolyte solution and the applied voltage in said electrolysis.

10. The process for manufacturing a metal nanotube of Claim 9, wherein the pH of said electrolyte solution containing metal is 0 to 5.5 and the applied voltage in said electrolysis is -0.5 to -1.5 V.